

Responses of a constructed plant community to combinations of herbicides, a model for field tests?

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As part of its regulation of pesticides, the US Environmental Protection Agency considers environmental risks, including impacts to nontarget plants exposed to pesticide drift. Normally these risk assessments consider impacts to individual species, using greenhouse, exposure-response experiments with growth endpoints. More sophisticated ecological field tests using simulated plant communities may be required, but are rarely conducted. Building upon a number of studies on the effects of drift levels on growth and reproduction of nontarget crop and native plant species, we developed field studies using a constructed Willamette Valley grassland plant community. We used nine perennial species: Oregon sunshine, toughleaf Iris, Lance selfheal, large camas, Roemer's fescue, blue wildrye, western buttercup, Virginia strawberry, and slender cinquefoil. Plots were established on two Oregon State University farms and studies were conducted over two years. The studies evaluated single and combined effects of glyphosate and dicamba on several response endpoints including % cover on a periodic basis, # of reproductive structures and seed production by species. Oregon sunshine had the greatest response- a significant reduction in total seed production with as little as 0.1 x FAR of dicamba, glyphosate or the combination of herbicides, in one year. These studies indicated the potential effects of low levels of herbicides on reproduction of native plants, and demonstrated experimental protocols whereby a plant community can be evaluated for ecological responses.